

LQCD Computing Operations

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LQCD Computing Review

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Talk Outline

- Operations Scope (what needs to be done)
- Staffing (project funded + contributions)
- Other expenses

Operations Scope

High Level View:

- Provide basic services at each site
(typical single site computer center operations)
- Provide data persistence across 3 sites
- Support meta-facility operations

Operations Scope (1)

- Provide basic services at each site:
 - Interactive services
 - software development: edit / (cross) compile / debug
 - interactive running: quick tests, interactive analysis
 - standard tools: make utility, scripting (perl, ...), others
 - Batch services
 - allocations & priorities to conform to local allocations
 - future: auto staging of required input files (even striping)
 - File services
 - temporary (high performance) and long term storage

Note: these services, and the several environments implied, are in the process of being standardized so that users can easily move their work from one site to another – portable code, batch scripts, file naming, etc.

Operations Scope (2)

- Basic services also includes:
 - repair of failed components; routine maintenance
 - backup of user directories
 - system administration
 - cyber-security (specific needs of the LQCD systems)
 - migration to each release of the user environment (profile)
 - installation of new releases of SciDAC software

Operations Scope (3)

- Provide data persistence:
 - Silos at FNAL, JLab will provide long term storage
 - High value data will be multiply stored, perhaps with one copy at NERSC or NSF centers
- In year 1, the primary flows will be the migration of configurations from BNL (QCDOC) to FNAL and JLab
- Operate as a Meta-facility:
 - Increasing capabilities:
 - Basic file transfer (manual management)
 - Catalogs (especially a meta-data catalog; leverage ILDG work)
 - Data grid; policy driven file migration; leverage SRM work
 - (perhaps) computational grid (low priority)

Uniformity

Goal: Make the 3 sites appear uniform to the user.

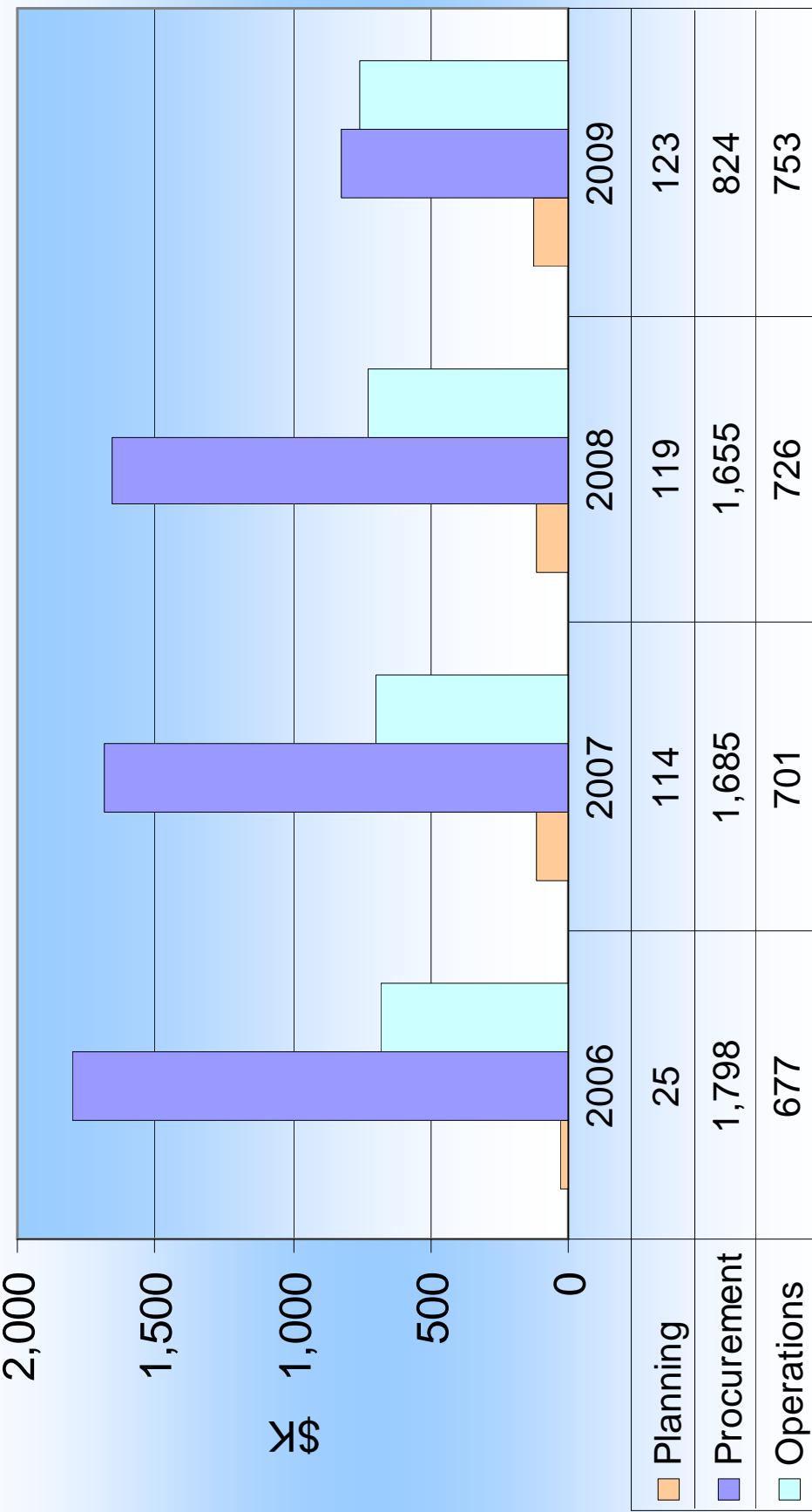
- Common library interface (API)
- Common run-time environment
 - disk layout, batch scripting support, etc.
- Web interfaces
 - inter-linked documentation (common, site specific)
 - inter-linked status pages
- Trouble tickets
 - integrate with host institution's systems
 - forward (most) software problems to SciDAC developers
 - forward multi-site problems to all effected sites

Leverage from Other projects

- Software & software support (SciDAC project)
 - Software is developed by base and SciDAC funding
 - Algorithm optimizations yield more science sooner
 - Developers help with deployment and with trouble shooting
 - General computer center services (host laboratories)
 - Wide-area networking & cyber-security (first line of defense)
 - Account management
 - Silo systems at FNAL, JLab
 - Depth of expertise in power, A/C, disk servers, ...
- The LQCD computing project imparts only small impacts on the host labs, but receives big benefits in return.

Funding Profile

LQCD Budget (May 5, 2005)



Operations: Staffing

- Operations staffing: project funded + contributions
 - Staffing is lean, as an incremental cost onto an operational computer center, and as an increment onto SciDAC prototyping
 - Operations support is 5 shifts / week, with some basic support possible for additional hours by leveraging site computer center staff (details to be worked out at each site)
 - FTE's come from this project and from base + SciDAC funding (MOU's still to be finalized):

Project + Base/SciDAC FTE	sysadmin / technician	software & user support	site management
BNL	0.75	0.5	0.25
FNAL	1.0 + 0.75	0.25 + 0.25	0.25
JLAB	0.4 + 0.25	0.25 + 0.25	0.25

- Software development & support, and prototype R&D (SciDAC) are not shown here

Operations: Expenses

■ Other Expenses:

- expansion of disk space: this is part of the “deployment” WBS element; disk capacity at each site will need to grow as compute capacity is added
 - tape (media) at FNAL and JLab (annual expense)
 - tape drive(s): as bandwidth requirements grow, the project may need to procure additional tape drives at FNAL and JLab to ensure adequate access speed
 - space, power, air conditioning are contributed by host laboratories
- These other expenses are approximately 3% of total costs (may vary year to year).

Current Status

- Basic services are currently running at a low level
 - current system is an outgrowth of the SciDAC & QCDOC projects
 - batch system not yet fully operational for the QCDOC (?)
 - new project funding will enable higher quality of operations, user support
 - allocations & accounting are initially single site X 3, and at BNL are implemented by pre-defined partitioning
 - LQCD API is maturing rapidly (details to follow)
- Common run-time environment
 - substantially defined
 - implementation is resource constrained; expect to have an initial version operational by project start
- Meta-facilities will be “basic only” at start
- Trouble tickets may be operational by project start
 - (perhaps single site X 3 only)

Final Comments

We intend to carefully balance hardware procurements and staffing so as to optimize science. We will always wish for more staff to make the system nicer, more user friendly. In this lean mode, a fair amount of user training and support will be distributed into the user community (where there is considerable expertise).

LQCD has a rather small set of projects for a facility of this size (typically a few active users per site doing the production running for a particular large collaboration), and all active users will become proficient in dealing with minor inconveniences.

These two facts will help to yield a good return on this investment for DOE.